

HATCHERY EVALUATION REPORT

Dworshak NFH - Summer Steelhead

September 1996

Integrated Hatchery Operations Team (IHOT)

HATCHERY EVALUATION REPORT

Dworshak NFH - Summer Steelhead

**An Independent Audit Based on Integrated Hatchery Operations Team
(IHOT) Performance Measures**

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Executive Summary

This report presents the findings of the independent audit of the Dworshak National Fish Hatchery (NFH) - Summer Steelhead program. The hatchery is located at the confluence of the North Fork Clearwater River and the main stem Clearwater River near Ahsahka in northcentral Idaho. The hatchery is used for adult collection, incubation, and rearing of Summer Steelhead and summer steelhead.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) Strategy for Salmon and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating

fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Dworshak NFH - Summer Steelhead Results

The Dworshak NFH facility includes four ponds for adult holding, 128 nursery tanks, 84 Burrow's rearing ponds, 42 raceways, and incubation facilities. The hatchery was constructed to mitigate for fish losses caused by construction of Dworshak Dam on the North Fork Clearwater River and hydroelectric facilities on the lower Snake River

The Dworshak NFH was in general compliance with most of the performance measures. In the area of program objectives, the hatchery was not meeting its adult return goal. The audit found that the hatchery was not in compliance with the screen approach criteria, adult holding facilities, rearing facilities, release facilities, water chemistry monitoring, alkalinity criteria, hardness criteria, and pathology-free water criteria, which are all facilities requirements. The hatchery exceeds its density criteria for early rearing, size at release, and disinfection protocols. In the compliance area for fish health policy, the hatchery was not following IHOT protocols for footbaths and did not maintain summaries of all diagnostic cases by fish lots. The hatchery did not have a broodstock collection plan or Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Dworshak NFH - Summer Steelhead program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- Develop broodstock collection plan
- Develop disease-free water supply
- Develop genetics and monitoring evaluation program
- Develop incubation standards for IHOT Operation Plan

- Develop rearing standards for IHOT Operation Plan
- Develop smoltification goal and monitoring program
- Develop summary of all diagnostic cases by fish lot
- Ensure the COE is following IHOT transportation procedures
- Extend release pipe into the river to reduce stress
- Follow IHOT criteria for female:male ratio
- Follow IHOT equipment and rain gear disinfection protocols
- Follow IHOT equipment disinfection protocols
- Follow IHOT footbath protocols
- Follow IHOT incubation standards for loading
- Improve fry- to- smolt survival
- Improve green-egg to eyed egg survival
- Increase alkalinity and hardness
- Increase flow to adult holding or reduce the number of adults held
- Install 64 additional nursery tanks
- Install solids removal system for Burrow's ponds
- Insulate feed hoppers and bulk storage facilities
- Modify adult holding ponds to reduce adult mortality
- Modify intake to reduce approach velocity or reduce flow
- Reduce the number of eggs retained by representative sampling of each male/female cross (when needed)
- Review published information on adult contribution
- Run analysis for missing water chemistry parameters
- Upgrade bird netting for Burrow's Ponds

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.

Facility Description

Name: Dworshak National Fish Hatchery

Stock/Species: Spring Chinook

Spring Chinook (Kooskia Stock)

Summer Steelhead

Rainbow Trout

Operating Agency: U.S. Fish and Wildlife Service

Funding Agencies: Lower Snake River Compensation Program

U.S. Fish & Wildlife Service

U.S. Army Corps of Engineers

Location: At the confluence of the North Fork Clearwater River and the main stem Clearwater River near Ahsahka in northcentral Idaho.

Address: Dworshak/Kooskia National Fish Hatchery

U.S. Fish and Wildlife Service

P.O. Box 18, State Highway 7

Ahsahka, ID 83520-0018

Hatchery Manager: Mr. William Miller

Phone: (208) 476-4591

Fax:

Purpose: Dworshak NFH began operations in 1969 rearing summer steelhead and resident trout. Additional construction was completed in 1982 under the Lower Snake River Compensation Program (LSRCP). The hatchery is to mitigate for loss of summer steelhead and resident trout habitat after the construction of Dworshak Dam on the North Fork Clearwater River. Summer Steelhead production is to mitigate for dams constructed on the lower Snake River.

Production Goal:

Summer Steelhead (B-Strain)

1.2 million yearling smolts (5.7/lb) for on-station release

1.1 million yearling smolts (5.7/lb) for off-station release

Spring Chinook

1.1 million yearling smolts (20/lb) for on-station release

Spring Chinook (Kooskia Stock)

Holding of adults, spawning, and incubation to green-eggs only

Rainbow Trout

200,000 fish (20/lb)

Total production 459,000 lb/year

Water Supply:

Clearwater River (90,000 gpm)

Pipeline from Dworshak Reservoir to incubation and early rearing
(YYY gpm)

Facilities:

Adult Holding:	4 adult holding raceways - 8,815 cf each
Incubation:	58 16-tray vertical tray incubators (928 trays)
Early Rearing:	128 nursery tanks - 90 cf each
Raceways:	84 BurrowÕs Ponds - 3,000 cf each
	42 raceways - 1400 cf each
Rearing Ponds:	none
Satellite Facilities:	none

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

Section 1 Performance Measures for General Information and Expenditure Information (PMs General 1-2)

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 2	Performance Measures for Program Objectives (PMs 1-4)
Section 3	Performance Measures for Facility Requirements (PMs 5-15)
Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and onsite visits. The site visit at the Dworshak NFH was conducted on September 19, 1996.

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.

3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.
4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as **Compliance Report**. That Compliance Report is Table 2 of this report.
5. This information was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Dworshak NFH - Summer Steelhead

The following includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (4) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Dworshak NFH - Summer Steelhead program. Each performance measure is presented in a table taken from the audit form (Table 2). The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Dworshak NFH - Summer Steelhead

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Dworshak NFH	S. Fork Clearwater River releases	Clearwater Hatchery	Magic Valley Hatchery ^(a)	Salmon River Tributaries	
Adult Collection	4					
Adult Holding	4					
Spawning	4					
Fertilization	4					
Incubation	4					
green-to-eyed	4		4			
eyed-to-hatch	4			4		
Rearing	4					
fry	4			4		
fingerlings	4			4		
smolts	4	4		4		
Acclimation/release	4				4	

(a) See Magic Valley Hatchery audit for a description of this program.

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan, US v Oregon, and (LSRCP)	
#2	Is the hatchery operating under a current hatchery operational plan? Is it understood by staff? Is it being followed?		4 4 4			IHOT Operations Plan and Dworshak- Kooskia NFH Complex Goals and Responsibilities	
#3	Is a hatchery monitoring and evaluation plan in place? Do you have a written monitoring and evaluation plan?		4			5-Year Production and Operation Plan for Dworshak NFH	
#4a	Adult contribution to fisheries, spawning grounds, and hatchery			4		No information provided to team on adult contribution by broodyear	Review published information on adult contribution
#4b	Adult pre-spawning survival as compared with established goal				4	Review of records; in compliance 3 out of last 5 years	Modify adult holding ponds to reduce adult mortality

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#4c	Egg-take as compared with established hatchery goal		4			Review of records; in compliance 5 out of last 5 years	
#4d	Green-egg to eyed-egg survival as compared with established goal				4	Review of records; in compliance 4 out of last 5 years	Improve green-egg to eyed-egg survival
#4e	Eyed-egg to fry survival as compared with established goal		4			Review of records; in compliance 5 out of last 5 years	
#4f	Fry to smolt survival as compared with established goal				4	Review of records; in compliance 0 out of last 5 years. IHN losses in raceway.	Improve fry-to-smolt survival See also PM #5h.
#4g	Production as compared with established goal		4			Review of records; in compliance 5 out of last 5 years	
#4h	Percent survival (smolt to adult) as compared with established goal				4	Review of records; in compliance 0 out of last 5 years	Improve adult returns
#4i	Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs	4				Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5a	Temperature						
	Does your water temperature meet the criteria for spawning?		4			Review of records/Discussion	
	Does your water temperature meet the criteria for incubation?		4			Review of records/Discussion	
	Does your water temperature meet the criteria for rearing?		4			Review of records/Discussion	
#5b	Dissolved gases						
	Is the oxygen level near saturation?		4			Review of records/Discussion	
	Is the dissolved nitrogen level less than saturation?		4			Review of records/Discussion	
#5c	Chemistry						
	Ammonia (un-ionized)			4		No information provided to team	Run analysis for ammonia and compute un-ionized ammonia
	Carbon Dioxide			4		No information provided to team	Run analysis
	Chlorine			4		No information provided to team	Run analysis
	pH		4			Review of records/Discussion	
	Copper		4			Review of records/Discussion	
	Hydrogen Sulfide			4		No information provided to team	Run analysis
	Iron		4			Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Zinc		4			Review of records/Discussion	
#5d	Turbidity						
	Does your turbidity meet the criteria?		4			Review of records/Discussion	
#5e	Alkalinity and hardness						
	Does your alkalinity and hardness meet the criteria?				4	Review of records/Discussion	Increase alkalinity and hardness
#5f	Nitrite						
	Does your nitrite meet the criteria?		4			Review of records/Discussion	
#5g	Contaminants						
	Aldrin		4			Review of records/Discussion	
	Endrin		4			Review of records/Discussion	
	Dieldrin		4			Review of records/Discussion	
	Heptachlor		4			Review of records/Discussion	
	Chlordane		4			Review of records/Discussion	
	Methoxychlor		4			Review of records/Discussion	
	Lindane		4			Review of records/Discussion	
	Malathion		4			Review of records/Discussion	
	Guthion		4			Review of records/Discussion	
#5h	Pathogens						
	What portions of the hatchery have disease-free water?						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Adult holding				4	Inspection of facilities/ Discussion	Reservoir water is not disease-free, but has not been a problem; develop disease-free water supply
	Incubation				4	Inspection of facilities/ Discussion	Develop disease-free water supply
	Early rearing				4	Inspection of facilities/ Discussion	Develop disease-free water supply
	Rearing				4	Inspection of facilities/ Discussion	Develop disease-free water supply
	Others				4	Inspection of facilities/ Discussion	Develop disease-free water supply

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#6	Alarm Systems Do the following areas have alarms? <div> Intake Large rearing ponds and adult holding ponds Raceway headboxes and rearing ponds Incubation facilities Quarantine areas and facilities Water treatment systems Security </div> Are there outside systems and buzzers in on-site residences? Are water flow alarms checked daily? Are all other alarms checked weekly? Is there a log of alarms for emergencies, tests, and maintenance requirements? Are telephone pagers used?		4 4 4 4 4 4		4 4 4 4 4	Inspection of facilities/ Discussion Inspection of facilities/ Discussion Inspection of facilities/ Discussion Inspection of facilities/ Discussion Inspection of facilities/ Discussion Inspection of facilities/ Discussion Not thought to be a problem Discussion Review of records/Discussion Discussion Review of records/Discussion Discussion	Install security system Is not a problem; have pagers.
#7	Adult collection and holding facilities						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Do you meet the adult holding criteria?				4	Do not meet the flow criteria	Increase flow to adult holding or reduce number of adults held
#8	Incubation facilities Type 1: Vertical Stack Do you have an adequate number of units for the overall program?		4			Inspection of facilities/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#9	Rearing facilities						
	Type 1: Nursery Tanks						
	Do you have an adequate number of units for the overall program?				4	Inspection of facilities/Discussion	Need 64 more nursery tanks
	Type 2: Burrow ^Ö s Ponds		4			Inspection of facilities/Discussion	
#10	Do you have an adequate number of units for the overall program?						
	Screening facilities						
	Do you meet the approach velocity criteria?				4	Inspection of facilities/Discussion	Modify intake to reduce approach velocity or reduce flow
	Are the fish screens regularly cleaned?		4			Inspection of facilities/Discussion	
	Does the screen mesh meet screen opening criteria?		4			Inspection of facilities/Discussion	
	Are rearing containers double screened for fish that should not be released to adjacent water?	4				Inspection of facilities/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#11	Predator control facilities						
	Are your predation control facilities effective?				4	Inspection of facilities/Discussion	Upgrade bird netting

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#12	Food storage facilities and quality control						
	Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations?		4			Inspection of facilities/Discussion	
	Does a regional quality control officer oversee production procedures and monitor:						
	Verification by feed manufacturer that ingredients meet specifications?		4			Tests performed by Ms. Ann Gannon at Abernathy	
	Ensure feed does not contain unwanted drugs or other additives?		4			Tests performed by Ms. Ann Gannon at Abernathy	
	Analyze ingredients contained in the final food product to ensure that feed specifications have been met?		4			Tests performed by Ms. Ann Gannon at Abernathy	
	Are the foods stored and handled according to the following criteria?						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Moist pellets should not exceed 10°F at point of delivery.		4			Discussion	
	Moist pellets should be removed from freezer just prior to feeding.		4			Discussion	
	Do not leave buckets of feed or feed containers outside exposed to light or heat.		4			Discussion	
	Open bags of feed should be fed within one to two days except when feeding small groups of fish.		4			Discussion	
	Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).				4	Discussion	Insulate feed hoppers and bulk storage facilities

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#13	Release facilities Do the release facilities ensure that fish are not subjected to adverse conditions?				4	Inspection of facilities/Discussion	Extend release pipe into the river to reduce stress
#14	Pollution abatement facilities Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)? Are pollution abatement facilities operated correctly?				4	Inspection of facilities/Discussion Discussion	Install solids removal system for BurrowÕs ponds
#15	Transportation facilities Are the transport systems adequate to meet IHOT performance measures for transportation practices?			4		Transportation provided by COE; no information provided	Ensure that COE is following IHOT transportation procedures

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	Broodstock selection practices						
	Is the donor selection process document attached?	4				Existing program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock?	4				Existing program; does not apply	
	Go to PM #40 in Genetics Section						
#17	Spawning practices						
	Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?				4	female:male ratio of 2:1 used instead of the IHOT criteria of 1:1	Follow IHOT criteria for female:male ratio
	Go to PM #42 in Genetics Section						
#18	Incubation practices						
	Are specific incubation standards listed in the hatchery operations plan?		4			Reviewed Dworshak NFH Goals and Objectives	Develop incubation standards for IHOT Operation Plan
	Are incubation practices written?		4				
	Incubation Type 1: vertical stack (see PM #8)				4	Review of records/Discussion	Follow IHOT incubation standards for loading
	Do you meet the loading and flow criteria?						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Incubation Type 2: hatching jars (see PM #8)		4			Review of records/Discussion	
	Do you meet the loading and flow criteria?						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#19	Rearing practices						
	Are specific rearing standards listed in the hatchery operations plan?		4			Reviewed Dworshak NFH Goals and Objectives	Develop rearing standards for IHOT Operation Plan
	Are rearing practices written?		4				
	Rearing Unit Type 1: Nursery Tanks (see PM #9)						
	Do you meet the density and DI criteria?				4	Review of records/Discussion	Need additional early rearing tanks
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	
	Rearing Unit Type 2: BurrowÕs Ponds (see PM #9)						
	Do you meet the density and DI criteria?		4			Review of records/Discussion	
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	
	Rearing Unit Type 3: Raceways (see PM #9)						
	Do you meet the density and DI criteria?		4			Review of records/Discussion	
	Do you meet the Loading and FI criteria?		4			Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#20	Smolt quality						
	Do you produce a high quality smolt?		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#21	Fish health management practices						
	Are the monthly hatchery monitoring visits being conducted? (PM #26)		4			Review of records/Discussion	
	Are the annual broodstock inspections being conducted? (PM #27)		4			Review of records/Discussion	
	Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)				4	Review of records/Discussion	Develop pathogen-free water supply
	Are the following water quality parameters within criteria? (PM #5a-5h)						
	Water temperature		4			Review of records/Discussion	
	Dissolved gases		4			Review of records/Discussion	
	Chemistry			4		Review of records/Discussion	Run analysis for missing water chemistry parameters
	Turbidity		4			Review of records/Discussion	
	Alkalinity and hardness				4	Review of records/Discussion	Increase alkalinity and hardness
	Nitrite		4			Review of records/Discussion	
	Contaminants		4			Review of records/Discussion	
	Are rearing standards being followed? (PM #19)				4	Review of records/Discussion	Install 64 additional early rearing tanks

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Are egg and fish transfer/release requirements met? (PM #31)				4	Review of records/Discussion	Develop summary of all diagnostic cases by fish lot

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a	Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?						
#22a1	Percent smoltification Do you measure percent smoltification? Did you meet the smoltification criteria?				4	No goal or monitoring program Discussion	Develop smoltification goal and monitoring program
#22a2	Rearing density (prior to release) Did you meet the rearing density criteria just prior to release?			4		No criteria listed	Develop rearing density criteria and monitor density prior to release
#22a3	Disease condition (at release) Did you meet all disease regulations just prior to release?		4			Review of records/Discussion	
#22a4	Number (at release) Did you meet the release number goal?		4			Review of records/Discussion	
#22a5	Size at release Did you meet the size goal?		4			Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#22a6	Dates of release						
	Did you meet the release date goal?		4			Review of records/Discussion	
#22a7	Location of release						
	Did you release the fish at the specified location?		4			Review of records/Discussion	
#22b	Are fish reared in the subbasin or acclimated in the subbasin?						
	Are the fish reared in the subbasin?		4			Discussion	
	Are the fish acclimated in the subbasin?		4			Discussion	
#22c	Is the release strategy appropriate for the program?		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

#23	Transportation facilities						
	Do transportation equipment and personnel receive disinfection before and after use?			4		COE transports this stock	Ensure that COE is following all IHOT transportation protocols
	Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?			4		Discussion	
	Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?			4		Discussion	
	Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?			4		Discussion	
	Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?				4	Discussion	Follow IHOT equipment disinfection protocols
	200 ppm chlorine for 30 minutes 600 ppm quaternary ammonia compound for 30 minutes 200 ppm iodophor solution for 10 minutes					Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

	Do personnel wear protective garments when handling fish eggs or cultural water?		4		Discussion	
	Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?			4	Discussion	
	Is a daily service inspection completed before starting up and leaving for the day?			4	Discussion	
	Does the fish transport unit receive an inspection prior to loading?			4	Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23 (cont.)	Transportation facilities						
	Does a pre-loading inspection covering: tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit?		4			Discussion	
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading?			4		Discussion	
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?			4		Discussion	
	Is water temperature in the transportation unit maintained within the 42-48 °F range?		4			Discussion	
	Do fish releasing procedures include the following criteria?						
	Releasing the fish at the correct release site or into the correct water body.		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		4			Discussion	
	The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#24	Evaluation practices						
	Has the hatchery conducted fishery contribution studies to:						
	Determine the requirements for evaluating and improving management programs?		4			Discussion	
	Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?		4			Discussion	
	Develop guidelines that define if the proper stocks of fish are currently being used?		4			Discussion	
	Determine which management units contribute to a specific fishery and the time periods of those contributions?		4			Discussion	
	Determine the relative contributions of the various management units to a specific fishery over the different time periods?		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#25	Training practices						
	Does the hatchery have a training schedule for its staff?		4			Review of records/Discussion	
	Does each staff member have a personal training plan approved by a supervisor and reviewed annually?		4			Review of records/Discussion	
	Does the hatchery routinely exchange training details between other hatcheries and agencies?		4			Review of records/Discussion	
	Does the hatchery encourage and reward off-duty training of staff?		4			Review of records/Discussion	
	Does the hatchery conduct monthly staff meetings?		4			Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	<p>Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?</p> <p>Conduct visit at least monthly</p> <p>Monitoring conducted by qualified fish health specialist</p> <p>Examine a representative sample of healthy and moribund fish from each lot.</p> <p>Review fish culture practices with hatchery manager.</p> <p>Report finding and results of necropsies on standard form.</p> <p>Recommend appropriate drug or chemical treatment.</p> <p>Summarize fish health status or stock prior to release or transfer to another facility.</p>		4			<p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p>	
#27	<p>Are all of the functions of the hatchery yearly monitoring visits being completed as described below?</p>						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Annually examine each broodstock for the presence of reportable viral pathogens.		4			Review of records/Discussion	
	Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .		4			Review of records/Discussion	
	Conduct inspection by or under the supervision of qualified fish health specialist.		4			Review of records/Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#28	Is the hatchery following accepted sanitation procedures?						
	Are there any sources of pathogen-free water, especially for incubation and early rearing?				4	Discussion	Need more pathogen-free water for incubation and early rearing
	Are the hatchery sanitation procedures understood and being followed as described below?						
	Disinfect/water harden eggs in iodophor?		4			Inspection of facilities/ Discussion	
	Are footbaths containing disinfectant placed at the incubation facility's entrance and exit?				4	Inspection of facilities/ Discussion	Follow IHOT footbath protocols
	Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?				4	Inspection of facilities/ Discussion	Follow IHOT equipment disinfection protocols
	Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		4			Inspection of facilities/ Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?		4			Inspection of facilities/ Discussion	
	Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		4			Inspection of facilities/ Discussion	
	Are dead fish properly disposed of?		4			Inspection of facilities/ Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#29	<p>Are water quality parameters being followed?</p> <p>Are the following water quality parameters within criteria? (PM #5a-5h)</p> <p>Water temperature</p> <p>Dissolved gases</p> <p>Chemistry</p> <p>Turbidity</p> <p>Alkalinity and hardness</p> <p>Nitrite</p> <p>Contaminants</p> <p>Go to PM #21</p>		4	4		<p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p> <p>Review of records/Discussion</p>	<p>Run analysis for some water chemistry parameters</p> <p>Increase alkalinity and hardness</p>
#30	<p>Are incubation and rearing standards being followed?</p> <p>Are the incubation practices following the IHOT incubation criteria? (PM #18)</p> <p>Are the rearing practices following the IHOT criteria? (PM #19)</p> <p>Go to rearing practices PM #18-PM #19</p>				4	<p>Review of records/Discussion</p> <p>Review of records/Discussion</p>	<p>Follow IHOT loading criteria for incubation</p> <p>Need additional early rearing tanks</p>

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#31	Are egg and fish transfer/release requirements met?				4	Not familiar with the requirement for a summary of all diagnostic cases by fish lot	Develop summary of all diagnostic cases by fish lot

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	Is the hatchery's program outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan, US v Oregon, and Lower Snake River Compensation Program	
	Go to subbasin plan PM #1						
#33	Is the hatchery operating under a current hatchery operational plan?		4			IHOT Operations Plan and Dworshak-Kooskia NFH Complex Goals and Responsibilities	
	Go to operational plan PM #2						
#34	Is a hatchery monitoring and evaluation plan in place?		4			5-Year Production and Operation Plan for Dworshak NFH	
	Go to hatchery monitoring and evaluation plan PM #3						
#35	Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?						

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Does the hatchery program meet the requirements for the following?						
	Species protocols (PM #4a)		4			Review of records/Discussion	
	Stock protocols (PM #4a)		4			Review of records/Discussion	
	Broodstock collection location protocols (PM #41)		4			Review of records/Discussion	
	Broodstock numbers protocols (PM #42)		4			Review of records/Discussion	
	Broodstock collection strategy protocols (PM #41)		4			Review of records/Discussion	
	Spawning protocols (PM #42)				4	Review of records/Discussion	Follow IHOT criteria for female:male ratio
	Egg-take protocols (PM #42)		4			Review of records/Discussion	
#36	Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?						
	Percent smoltification (PM #22a1)				4	Review of records/Discussion	Develop goal and monitoring program

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
	Rearing density (PM #22a2)				4	Review of records/Discussion	Need 64 additional early rearing tanks
	Disease condition (PM #22a3)		4			Review of records/Discussion	
	Number at release (PM #22a4)		4			Review of records/Discussion	
	Size at release (PM #22a5)		4			Review of records/Discussion	
	Date of release (PM #22a6)		4			Review of records/Discussion	
	Location of release (PM #22a7)		4			Review of records/Discussion	
#37	Are fish reared in the subbasin or acclimated in the subbasin? See PM #22b		4			Discussion	
#38	Is the release strategy appropriate for the program? See PM #22c		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#39	For new programs, has a broodstock collection plan been developed?						
	Is the broodstock collection plan written?	4				Existing Program; does not apply	
	For a non-captive broodstock program:	4				Existing Program; does not apply	
	Was an unbiased, representative sample collected?						
	Was the recommended number of broodstock collected?	4				Existing Program; does not apply	
	For a captive broodstock program:						
	Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?	4				Existing Program; does not apply	
	Were full-sib crosses avoided?	4				Existing Program; does not apply	
	Is the broodstock collection plan understood and being followed by staff?	4				Existing Program; does not apply	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

		N/A	Yes	?	No		
#40	For a new program, was the donor selection outline followed in selecting the hatchery broodstock?						
	Is a donor selection plan written?	4				Existing Program; does not apply	
	Was the donor selection outline followed in selecting the broodstock?	4				Existing Program; does not apply	
	Was the target stock recommended in the donor selection process actually used?	4				Existing Program; does not apply	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#41	For existing programs, were the broodstock collection procedures followed?						
	Is the broodstock collection plan written?				4	None supplied to inspection team	Develop broodstock collection plan
	Does the broodstock collection plan follow the guideline:						
	Was an unbiased, representative sample collected?		4			All the returning adults were collected	
	Was the recommended number of broodstock collected?		4			All the returning adults were collected	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#42	Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?						
	Are the spawning protocols written?		4			Review of Dworshak NFH Goals and Responsibilities	
	Are daily or weekly spawning logs available?		4			Review of records	
	Was the appropriate number of spawners used?				4	Discussion	Follow the IHOT female:male ratio criteria
	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?		4			Discussion	
	Was the sex-ratio within the limits given in the performance standards?		4			Discussion	
	Were the fertilization protocols followed?		4			Discussion	
	If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?				4	Discussion	Reduce the number of eggs retained by representative sampling of each male/female cross (when needed)

Table 2 Dworshak NFH Hatchery - Summer Steelhead Compliance With Performance Measures

#43	Is there a genetics monitoring and evaluation program in place?						
	Is a genetics monitoring and evaluation program available?				4	None provided to inspection team	Develop genetics monitoring and evaluation program
	Does the plan address the following elements listed in IHOT:						
	Does the program have elements needed to meet evaluation goals 1-4?	4				Discussion	
	Has a qualified geneticist reviewed and endorsed the program (goal 5)?	4				Discussion	
	Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?	4				Discussion	
	Is the program understood and followed by staff?	4				Discussion	

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Dworshak NFH - Summer Steelhead

This section presents the corrective actions required to bring the Dworshak NFH - Summer Steelhead program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

Table 3. Remedial Actions Required at Dworshak NFH - Summer Steelhead

Remedial Action Required	Cost	PMS ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Improved adult returns	----	4h
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Review published information on adult contribution	----	4a
Install security system	----	6
IHOT requires outside security systems and buzzers	----	6
Ensure the COE is following IHOT transportation procedures	----	15,23
Follow IHOT criteria for female:male ratio	----	17
Develop incubation standards for IHOT Operation Plan	----	18
Follow IHOT incubation standards for loading	----	18
Develop rearing standards for IHOT Operation Plan	----	19
Develop smoltification goal and monitoring program	----	22a1, 36

Remedial Action Required	Cost	PMS ¹
Follow IHOT equipment disinfection protocols	----	23
Follow IHOT footbath protocols	----	28
Follow IHOT equipment and rain gear disinfection protocols	----	28
Develop summary of all diagnostic cases by fish lot	----	31
Develop broodstock collection plan	----	41
Reduce the number of eggs retained by representative sampling of each male/female cross (when needed)	----	42
Develop genetics and monitoring evaluation program	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for missing water chemistry parameters	----	5c, 21,29

Type 4 - Remedial actions requiring significant capital expenditures		
Install 64 additional nursery tanks	\$1,000,000	9,19,21
	0	
Modify intake to reduce approach velocity or reduce flow	\$1,500,000	10
	0	
Upgrade bird netting for BurrowÕs Ponds	\$150,000	11
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Modify adult holding ponds to reduce adult mortality	----	4b
Improve green-egg to eyed-egg survival	----	4d
Improve fry-to-smolt survival	----	4e
Increase alkalinity and hardness	----	5e, 21, 29
Develop disease-free water supply	----	5h, 21, 28
Increase flow to adult holding ponds or reduce the number of adults held	----	7
Insulate feed hoppers and bulk storage facilities		12
Extend release pipe into the river to reduce stress	----	13
Install solids removal system for BurrowÕs ponds	----	14

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Dworshak NFH - Summer Steelhead program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Dworshak NFH - Summer Steelhead**

Year	Fisheries (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution (Broodyear)	Smolt to Adult Survival (percent)
1981					
1982					

¹1 Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

¹1 Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1983					
1984					
1985					
1986	17,316	--	5,973		1.93
1987	7,646	--	4,528		0.95
1988	3,312	--	2,152		0.51
1989	6,047		4,566		0.91
1990					
1991					
1992					

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the Dworshak NFH - Summer Steelhead program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in a separate table (Table 5a).

Table 5. Annual Operating Expenses - Dworshak NFH - Summer Steelhead

Hatchery	1994	1995	1996
1. Dworshak NFH	\$1,360,130	\$1,448,600	\$1,441,911
2.			
3.			
4.			
5.			
Total Program Costs	\$1,360,130	\$1,448,600	\$1,441,911

The total expenditures for the Dworshak NFH are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery is presented in separate tables (Tables 6a and 6b).

Table 6. Annual Operating Expenses - Dworshak NFH

Program	1994	1995	1996
1. Summer Steelhead	1,360,130	\$1,448,600	\$1,441,911
2. Spring Chinook	\$407,000	\$334,000	\$337,000
3. Rainbow Trout	\$10,000	\$10,000	\$10,000
4. Summer Steelhead (Kooskia stock)	?	?	?
5.			
Total Hatchery Costs	\$1,777,130	\$1,792,600	\$1,788,911

Table 5a. Annual Operating Expenses: Dworshak NFH - Summer Steelhead

Expenditure Occurring at Dworshak NFH

Component	1994	1995	1996
Personnel Costs	\$690,000	\$700,000	\$725,000
Operational Costs	\$365,440	\$394,320	\$461,000
Capital Costs	\$75,400	\$117,000	\$40,000
Indirect Costs	\$113,000	\$137,280	\$115,191
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$100,000	\$100,000	\$100,000
Total Hatchery Costs	\$1,777,130	\$1,792,600	\$1,788,911
Source of Funds			
LSRCP, COE, .	100%	100%	100%
USF&WS			
Program Production (lb)	--	--	--
Total Production (lb)	--	--	--
Program as Percent of Total	76%	81%	81%

¹ Rainbow program costs of \$10,000/year included with summer steelhead program; rainbow costs assigned to personnel cost component

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Program Costs	1,360,130	\$1,448,600	\$1,441,911
----------------------	------------------	--------------------	--------------------

Table 6a. Detailed Expenditures at Dworshak NFH by Program

Summer Steelhead

Component	1993	1994	1995
Personnel Costs	\$697,000	\$701,000	\$725,000
Operational Costs	\$365,440	\$394,320	\$461,000
Capital Costs	\$75,400	\$117,000	\$40,000
Indirect Costs	\$113,000	\$137,280	\$115,191
Lumped Hatchery Costs			
Lumped Third-Party Costs	\$100,000	\$100,000	\$100,000
Total Hatchery Costs	\$1,777,130	\$1,792,600	\$1,788,911
Source of Funds			
LSRCP, COE, USF&WS	100%	100%	100%
Program Production (lb)	--	--	--
Total Production (lb)	--	--	--
Program as Percent of Total	76%	81%	81%
Program Costs	1,360,130	\$1,448,600	\$1,441,911

¹ Rainbow program costs of \$10,000/year included with summer steelhead program; rainbow costs assigned to personnel cost component

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Table 6b. Detailed Expenditures at Dworshak NFH by Program

Spring Chinook

Component	1994	1995	1996
Personnel Costs	\$185,000	\$192,000	\$185,000
Operational Costs	\$222,000	\$113,000	\$115,000
Capital Costs	0	\$29,000	\$37,000
Indirect Costs	0	0	0
Lumped Hatchery Costs			
Lumped Third-Party Costs			
Total Hatchery Costs	\$1,777,130	\$1,792,600	\$1,788,911
Source of Funds			
LSRCP, COE, USF&WS	100%	100%	100%
Program Production (lb)	--	--	--
Total Production (lb)	--	--	--
Program as Percent of Total	24%	19%	19%
Program Costs	\$407,000	\$334,000	\$337,000

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹1 PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.